

**Senate and House of Representatives
State of Idaho
Biotechnology Task Force**

**Joint Finance-Appropriations Committee Room 328
State Capitol, Boise, Idaho
September 7, 2005**

Minutes

(As Approved by the Task Force)

The meeting was called to order at 9:30 a.m. by Cochairman Senator Gary Schroeder. Other committee members present were Cochairman Representative Doug Jones, Senator Chuck Coiner, Senator Russ Fulcher, Senator Bert Marley, Representative Darrell Bolz, Representative Ann Rydalch and Representative Nicole LeFavour. Senator Hal Bunderson and Representative Frank Henderson were absent and excused. Staff members present were Maureen Ingram and Toni Hobbs.

Others present included Dr. Charles Hatch, Dr. Carolyn Bohach and Dr. Mike Laskowski, University of Idaho; Dr. Jack Pelton, Dr. Julie Oxford and Mark Dunham, Boise State University; Dr. Robert Wharton and Dr. Chris Daniels, Idaho State University; Dr. Richard Olson, Gem Pharmaceuticals; Dr. Dennis Stevens, Veterans Administration Medical Center; Dr. Theodore A. Walters, Mountain States Tumor and Medical Research Institute, St. Luke's; Dr. Timothy Sawyer, St. Alphonsus Regional Medical Center; Dan Salmi, VA Medical Center/O.D.260; Thomas R. Glass and David Smith, Sapidyne Instruments; Dr. John Tracy, Idaho Water Resources Research Institute; Dr. Xavier Danthinne, O.D.260, Inc; Eldon Wallace; Emile Loza and Jimmi Sommer, Technology Law Group; Phil Syrdal and Moriah Nelson, Bio-Idaho; Karl Tueller, Office of Science and Technology, Idaho Department of Commerce and Labor; Wayne Hoffman, Idaho Department of Agriculture.

After opening remarks by the cochairmen, Senator Marley moved the minutes of July 27, 2005, be approved; Representative Jones seconded the motion. The motion passed unanimously by voice vote.

Dr. Charles Hatch, Vice President for Research at the University of Idaho, said that historically the professional programs at Idaho's land grant university have focused on the life sciences in agriculture and natural resources, as molecular biology and genetics, plant sciences (crops and forests) and animal sciences (livestock and wildlife/fish). He noted that the focus is changing in the 21st century. The focus is now on multidisciplinary teams including:

- , Professional programs in Agriculture & Natural Resources
- , Biological Science and Molecular Biology
- , Chemistry, Mathematics and Physics
- , Engineering

According to **Dr. Hatch**, the critical success factors necessary for biotechnology in Idaho are having critical mass of scientists and modern, well-equipped laboratories. He said that recently the institution, with the arrival of the new president, has put a program in place that has some very specific themes that are unique and relevant to the meeting today. These include:

Promoting Science and Technology in Idaho. **Dr. Hatch** said this is closely aligned with the State Office of Science and Technology and has a biosciences research emphasis built into it. This involves research, development and management of biological-based organisms and ecosystems.

Catalyzing Entrepreneurial Innovation. **Dr. Hatch** stated that merely developing technologies at the university is not sufficient, since these technologies are going to add value to the state and to the university and to the individuals that develop them. These innovations need to be moved into the marketplace. Having a strategic theme that addresses moving technology to the marketplace is a critical element of success.

Steward the Environment. **Dr. Hatch** said this is something the land grant university has always done through agriculture and natural resources programs. It continues to be important today. He said that our natural resource based industries are very different than they used to be because of technologies and biotechnologies that have made them relevant for today's workplace and today's markets.

Dr. Hatch said that within these themes, the university has started to focus on where to emphasize biotechnologies and has identified funding sources:

Infectious Diseases (NIH COBR)
Microbial Ecology (NIH COBR)
Reproductive Biology (NSF & USDA)
Developmental Biology (NSF & USDA)
Neuroscience (NIH and NSF)
Bioinformatics (NSF and NIH)

Dr. Hatch explained that his presentation will be followed by colleagues from the other two universities in Idaho. In his opinion there is relatively little overlap between many of their themes. Each university seems to be finding a unique niche where they have the critical mass and capabilities to do what they do best. He noted that all three universities are working together on neuroscience and bioinformatics. The following shows the number of University of Idaho's faculty devoted to Science and Technology.

College	Total S&T Faculty	Full-time Research Equivalents	Full-time Biotech/Biomed Equivalents
Agriculture and Life Sciences	221	60	24
Engineering	74	22	9
Natural Resources	45	17	7
Science	79	31	12
Total	419	130	52

Dr. Hatch stated that the other colleges are extremely important as well because there are legal, social and

ethical issues associated with biotechnology and science and technology. Bringing in lawyers, social scientists and philosophers is extremely critical to being able to put together a complete science and technology team. The above table just focuses on core faculty involved in science and technology.

In response to a question from **Representative Jones** regarding how the number of faculty compares to other land grant universities in the west, **Dr. Hatch** said that the 419 faculty number is probably similar to Montana State and other institutions that are about the same size as the University of Idaho. Oregon State and Washington State are similar in terms of mission but they do have larger core faculty. Large core faculty allows more time to be assigned to science and technology research.

Representative Rydalch asked if the University of Idaho offers Ph.D. degrees in the focus areas mentioned above. **Dr. Hatch** said that Ph.D.'s are offered in all of those focus areas.

Dr. Hatch identified the university's external grant and contract expenditures through the University of Idaho Research Enterprise:

- , Had nearly \$75 million of G&C expenditures in 2005
- , 40% or about \$30 million of the expenditures supported life sciences research
- , 36% or about \$27 million of the expenditures supported other science and technology research areas
- , 24% or about \$18 million of the expenditures supported other creativity activities

With regard to innovations and technology transfer accomplishments, the University of Idaho has:

- , Disclosed 108 new technologies during the past 3 years
- , Awarded 11 new patents during the past 3 years
- , 44 active patent applications are under consideration
- , 47 active technology licenses in 2005
- , Helped create 2 new start-up companies during the past 3 years

In **Dr. Hatch's** opinion, this shows that the research enterprise does much in terms of training people for the workplace as well as getting new technology into the workplace to create opportunities for Idaho businesses and industries.

Representative Rydalch asked if the university pays for both national and international patents. **Dr. Hatch** answered that the university covers the domestic patent costs. He said they make every attempt to find licensees that want the technology who will then cover those costs. He added that they only do international patents if they find a licensee to bear the cost.

Representative Jones asked if it is allowed or encouraged, once the university is successful in patenting a technology, for a researcher to extend the patent internationally. **Dr. Hatch** said that is allowed but the process is more expensive because it has to be done per country. If the university pays for patent costs and the technology is then licensed, the university gets patent costs back.

Representative Rydalch asked if the researchers benefit from licensing fees that come back to university. **Dr. Hatch** said yes, the State Board of Education very much supports and allows this and has provisions for this in its intellectual property policies. It is different than private industry in that 40% of licensing

revenue is returned to inventor team, 40% goes back to university or research foundation to provide for protection and future patent costs, and 20% goes to the department associated with the inventor or inventor team. In his opinion, board policy provides a significant incentive for faculty to disclose and benefit from that disclosure as well as allowing the university and the state to benefit from that disclosure.

Dr. Hatch discussed challenges facing a competitive research program. These include:

- , Faculty recruitment and retention and competitive salaries
- , Equipped, modern laboratories
- , Graduate student recruitment and competitive salaries
- , Maintenance, renovation and development of laboratories
- , Maintenance and acquisition of equipment

Dr. Hatch said that Boise State University, University of Idaho and Idaho State University are not competing against each other for faculty. When new faculty is needed, the university searches in Oregon, California, Massachusetts and so on where quality institutions are producing quality graduate students to try and attract these students to Idaho. It is very competitive. This is why competitive salaries are so important.

Dr. Hatch explained that research facilities and equipment for biotechnology are expensive. New laboratory construction costs \$300/sq. ft. or more as contrasted to just building an office or classroom at less than \$200/sq. ft. The \$300/sq. ft provides hoods, benches, conditioned water, gas, air and IT networks but it does not include any equipment.

The scientific equipment for a laboratory in a biotechnology arena includes:

- , Genetic Sequencers @ \$100K to \$250K, many needed
- , Mass Spectrometers @ \$200K to \$500K, many needed
- , NMR Spectroscopes @ \$200K to 900K, several needed
- , Electron Microscopes @ \$300 to \$900K, one to three needed

Dr. Hatch explained that electron microscopes become increasingly important and move to the high end of the monetary range when molecular and DNA sequencing are involved.

Dr. Hatch said that new assistant professors cost about 80% of a full professor's salary. This does not include the start-up costs to provide them with good laboratory space, specialized equipment and at least one graduate student stipend. A new full professor costs about 140% of an existing full professor's salary as well as competitive start-up costs. This includes duplicating or enhancing the professor's existing laboratory facilities.

Senator Schroeder asked if the 80% and 140% data is unique to the University of Idaho. **Dr. Hatch** said yes, and would also be indicative of Boise State University and Idaho State University. Larger institutions would probably not be as high.

Dr. Hatch said that these new full-time professorships will support from three to five graduate students. They will support a research technician and will support one or two post doctorates. These will be paid by funds that come from outside of the state through competitive grants and contracts programs. There are

additional employees to the institution that the state does not have to pay for. The research program is bringing in new dollars that pay for this. This also provides at least one to three additions to the biotechnology workforce annually because the post docs and graduates students move on.

Representative Bolz asked what Idaho's relationship is in terms of the number of post docs compared to other universities tied in to research. **Dr. Hatch** said that well funded, strong research programs tend to have a collection of post docs associated with them. He said that most of Idaho's programs are under-supported in the post doc area because the size of the research program is not sufficient to maintain graduate students, post docs and technicians.

Dr. Hatch said that our state's science infrastructure is limited. In order to compete, we must focus on our strategic advantages and areas where we can excel. To compete, we must collaborate to leverage our individual resources into a nationally competitive critical mass facilitated by a state-wide, broad-band communication network. The university has expertise in managing a science enterprise. It utilizes graduate education to create new technology as well as to develop the next generation biotechnology-trained workforce.

Representative Bolz asked what the future looks like for Idaho in terms of getting grants for faculty. **Dr. Hatch** said that, in his opinion, it is very bright. They are keeping a lot of professors. He said that fortunately grants and contracts funds are external to the state so those dollars have been used to retain faculty, to enhance laboratories and to create environments for science. The maintenance and renovation of laboratories, the building of new space and new laboratories will allow them to continue to retain faculty but state support will be necessary to do this.

Senator Schroeder asked what the task force can do from a public policy perspective to facilitate the interface between industry, government and educational institutions in the state in the area of biotechnology. **Dr. Hatch** said one thing would be to keep the focus on the 21st century conductivity issues the state faces and must have for people to work together. This means having broadband internet available among the major institutions in the state so people can interact as if they were face to face when they are actually many miles apart. Idaho is a difficult place to get around and the ability to communicate electronically will allow expansion of the critical mass significantly. Another item would be to facilitate working with industry in the transfer of technology from university to industry so that innovations from the universities that are needed by industries in Idaho are made available. The people that use technology need to be talking to those developing it. Keeping people focused on that is very important.

Representative Rydalch asked whether the infrastructure with regard to the transfer of technology to industry is in place at the university. **Dr. Hatch** said that is marginally in place statewide. All of the universities are relatively small research institutions. He said it is reasonably well supported at the University of Idaho but collectively the universities are just getting by.

Representative LeFavour asked what the time frame would be for them to get up and running if funds were available to buy the necessary equipment, build the facilities and to hire the faculty. **Dr. Hatch** said they could get up and running right away because strategic planning and focus are in place, and they could target resources in a way that they could effectively be used immediately. Otherwise, it is a sequential process. It would take some time to hire new team members, graduate students and so on. **Representative LeFavour** asked if it would be helpful for this task force to make a case with JFAC for funds to help the

universities move forward. **Dr. Hatch** said that the types of issues being discussed, retention and recruitment of faculty and other infrastructure issues, are the same for all higher education, not just biotechnology. In his opinion, it would be hard to target money just for science and technology needs. He said that the University of Idaho's science and technology programs are a cornerstone of the institution's priorities.

Representative Jones said that earlier this year there was an issue within the agricultural community when some patented materials were licensed to other states and overseas to competing companies for technology thought to belong to Idaho in the potato industry. He asked if there is any policy in place that gives first chance or preference to in-state or regional companies for technology developed at our universities. **Dr. Hatch** said he does not believe that the State Board of Education's policies had any bearing on the above issue. He added that the communication between various entities within the university and the College of Agriculture and Life Sciences had very great bearing on the issue. As a result of that, the university is in the process of putting together documents that more fully explain policies, how to communicate with each other and how decisions are made as to how to use and license technology within the institution. He said there is also an external review team looking at changes being made to make sure Idaho's technology is used appropriately.

Dr. Hatch's PowerPoint presentation is available as an attachment to these minutes at: www.legislature.idaho.gov.

Dr. Carolyn Hovde Bohach, Associate Director of the Idaho INBRE program and Professor of Microbiology, Molecular Biology, and Biochemistry at the University of Idaho, explained that she was speaking to the task force on behalf of her husband, **Dr. Greg Bohach, Director of the Ag Experiment Station**, who could not attend the meeting. She began with the messages she wants to convey:

- , Research in infectious disease has been successful in Idaho.
- , A moderate investment by the state can be leveraged to bring in large amounts of federal and company dollars.
- , The State should continue to support biomedical research.
- , The State should provide ways for companies to take Idaho biotech discoveries to the marketplace.

Dr. Bohach said the last statement was probably the most important. In response to a question from **Senator Schroeder**, **Dr. Bohach** said she did not know what the state could do specifically, but that is an area that needs to be focused on. **Representative Rydalch** commented that it is not usually the state which provides the opportunities to take discoveries to market; it is usually the universities who do this. She said that state can assist and asked if the university is staffed to do this and if they are pursuing this. **Dr. Bohach** said she was not thinking about what would happen on the university level but more about the infrastructure of small businesses in Idaho. She said it would have been very helpful to her and her husband if there had been an Idaho company that they could have worked with.

Dr. Bohach explained that the categories of infectious disease research at the University of Idaho include:

- , PLANTS, including plant pathology (diagnostics and surveillance) and plant biotechnology (breeding programs, resistance, especially wheat, potato, bean, and edible vaccines, human GI

infections)

ANIMALS, including diagnostics and surveillance, basic/applied animal health & well-being research, and animal models for human infections

HUMAN

Dr. Bohach said that human infectious disease is her area of expertise and in her opinion the University of Idaho has a very strong program with faculty in all of these areas. Within human infectious disease, study is either basic research at the molecular and cellular levels, or is applied research, which is biotechnology. Outlines of these two areas are:

Basic Research (Molecular and Cellular)

Bacteria

- C Staphylococcal wound infections, food poisoning, toxic shock syndrome, and mastitis
- C E. coli diarrhea and vascular/kidney failure
- C Streptococcal wound infections and toxic shock syndrome
- C Gas gangrene
- C Plague
- C Tularemia

Viruses

- C Rhinovirus (colds/hoof and mouth)
- C Cytomegalovirus (birth defects)

Parasites

- C Toxoplasma (toxoplasmosis)

Dr. Bohach said the areas of basic research have all either led to or have the potential to lead into applied research (biotechnology) areas. These include:

- Vaccines as conventional and biosecurity agents with uses in human and animal infectious diseases
- General immunostimulants, as adjuvants
- Anti-cancer therapy
- Antibiotics/antimicrobial compounds

Dr. Bohach went on to discuss one example of biotechnology that resulted from basic infectious disease research that took place primarily in her husband's laboratory. This is known as superantigen therapy. She explained that this came about through research done on *Staphylococcus aureus*. This organism causes toxic shock syndrome and staphylococcal food poisoning. Staph aureus causes these diseases because it makes a special kind of toxin known as a superantigen. This superantigen has a uniquely unfortunate characteristic in that it turns off a person's immune system causing immunosuppression.

Superantigens are also involved in animal disease by causing the same immunosuppression seen in humans. Staphylococcal mastitis found in cows is a very significant disease because it is estimated to have caused \$2 billion in lost revenues in U.S. annually. This is because it causes the milk to become infected as well as the cow. The reason the animal cannot fight off the disease is because the toxin is immunosuppressive. It turns off the normal immune response at that sight.

She explained that once the structure of the molecule was established, **Dr. Greg Bohach** was able to create

a new molecule that retained all of the good immunostimulatory factors but all of the toxicity and immunosuppression was removed. This new molecule was patented by Dr. Bohach; the University of Idaho paid those costs.

As the next step, **Dr. G. Bohach** thought this modified superantigen should be used in animals for mastitis. In order to get the money necessary, they applied for a USDA Small Business Initiative Research Grant. To qualify for these loans, a company has to exist. So they and two of their colleagues formed a company called Idaho Immunodiagnostics, Inc. (III). She said this was very hard for them to do because they do not know anything about business or how to start a company. Once they figured out how to form the company, they got the grant and the first round of testing provided very good data. When they applied for renewal of the grant, they USDA did not think the data was strong enough and the renewal grant was denied.

In order to continue with their work, they had to look for a company or funding source that would back them. Even with the help of the Idaho Research Foundation, they were unable to find a company in the United States that would back them. Through another colleague in Korea, Dr. Park, they established a cooperation with LG Life Sciences who funded about \$300,000 worth of animal trials in South Korea that confirmed everything that was shown with the SBIR grant and have since funded larger trials that are going on at Washington State University. Governor Kempthorne awarded the Governor's Valued Partner Award to Dr. Yang, who is the CEO of LG Life Sciences.

Dr. Bohach pointed out that the modified staph aureus molecule that her husband created is not operating based only on staph aureus diseases. It is really a non-specific augmentation of the immune response so maybe it can be used more broadly, possibly as an anti-cancer therapy or to protect the population against terrorist threats. In collaboration with a California company, JenQuest, Inc., a clinical trial on a form of lung cancer showed that patients who received the superantigen therapy lived substantially longer with this treatment.

Dr. Bohach said that superantigen therapy can also be useful in bioterrorism. The organism *Y. pestis* (the causative agent of plague) is very deadly and needs to be handled in a BSL-3 containment facility which the University of Idaho has. If one bacterial cell of this organism is inhaled, death will occur within one to four days. Animal trials being done with mice show that 60% of the animals that receive therapy are alive up to 14 days after exposure.

Dr. Bohach described the following strengths and opportunities in the area of human infectious disease research:

- , Critical mass and diverse expertise (12 faculty)
- , NIH COBRE and NIH INBRE funding
- , Potential for integrating with EPSCoR funding
- , Close link between biomedical and agriculture research including zoonotic infections and broad host-range bacteria
- , Scientific cooperation (University of Idaho, Boise State University, Idaho State University, VA)
- , Sophisticated cell and molecular biology infrastructure
- C \$32 million in competitive federal funding since 1988 (mostly NIH)

- C Bioinformatics (NIH and NSF funding)
- C Cell separation and analysis
- C Confocal and electron microscopy
- C Proteomics and genomics labs
- C BSL-3 facility and availability of biodefense funds

She explained that the BSL-3 facility allowed them to seek biodefense funds that brought in \$2 million within one year of the lab being built.

The weaknesses and threats include:

- , Faculty retention (competition with medical schools)
- , Inadequate statewide internet technologies to take advantage of NIH Lariat funding
- , Lack of local (Idaho) corporation partners
 - C Need to look globally
 - C Inadequate resources to take advantage of SBIR programs

She reiterated how difficult it was for them to form the company required to get the SBIR grant as scientists. The company was eventually dissolved because the required paperwork, taxes and accounting were too time consuming, and kept her out of the lab where she prefers to be.

Dr. Hovde Bohach's PowerPoint presentation is available as an attachment to these minutes at: www.legislature.idaho.gov.

Dr. Robert Wharton, Vice President for Academic Affairs at Idaho State University discussed Bioscience/Biomedical research at Idaho State University. He said that the universities of the state are working very well together at this time. Idaho State University has made progress in research as follows:

- , Growth: Annual total research awards have risen steadily over the last 20 years, from about \$1M in 1985 to \$28M in 2004. He said that in his opinion this could easily be doubled in the next five years without requiring a lot of new resources.
- , Total submissions exceeded \$95M in 2004.
- , Research at Idaho State University is complementary to that of the other universities.

He said that the BRIN/INBRE program has promoted a collaborative spirit among the universities for developing biomedical research. Through this program, the development of BioIdaho has facilitated bringing faculties together today. He pointed out that the activities responsible for bringing BioIdaho to the forefront in the state have been complementary to that of the universities.

Dr. Wharton said that the Idaho State University Biomedical Research Institute was just recently approved by the State Board of Education. This was a faculty-driven effort that allowed the university to:

- , Restructure biomedical research on campus
- , Improve efficiency of how biomedical research is done
- , Improve success rate of research funding
- , Focus on collaborative and integrated research

Research Centers at Idaho State University include:

- , Molecular Research Core Facility, a state-of-the-art DNA sequencing center. He said this is a core facility that is used by many researchers on campus and off campus.
- , Idaho Accelerator Center, a unique facility in the nation. He said that there is a fair amount of biological research done here studying the effects of radiation on organisms.

He emphasized that they are focusing on growing the biomedical, health science research activities on the campus thereby contributing to the State of Idaho's role in biomedical research. He added that because of their affiliation with INL, they are interested in growing that capability as well.

Dr. Wharton said that in terms of specific focus on the biomedical side, Idaho State University has a biomedical engineering component that includes working in the areas of both medical informatics and medical device development. He added that Idaho State University is also working with partners such as the E-Med Center of Excellence at the University of Western Australia; University of Seville, Spain; Princeton Autism Technology, NJ; and AMIS, Pocatello, ID.

Idaho State University is focused on understanding disease processes and drug discovery. Idaho State University provides expertise in the areas of molecular to systems pharmacology, drug characterization, preclinical studies, and drug delivery.

Dr. Wharton stated that issues limiting continued development are much the same as those faced by the University of Idaho. These include:

- , Faculty recruitment and retention
- , Faculty salary compression
- , Facility development
- , Need to foster culture of and resources for technology transfer

Dr. Wharton said that it "boils down" to people and resources. In order to have continued success, Idaho universities need to be able to do the following:

- , Hire and retain the best and the brightest people available
- , Provide the necessary resources
- , Allow them to do their job and succeed
- , Harvest the rewards!

Representative Rydalch asked if there will be a need for a medical school at Idaho State University in the future. **Dr. Wharton** said that is a decision for the state to make. He said the time will come when Idaho will need a medical school and the state should think about taking steps to make that happen. In response to another question from **Representative Rydalch**, **Dr. Wharton** said that in his opinion it would be cost effective and worthwhile for Idaho to be able to educate its own students in the medical professions, and as the population grows, that time will come.

Representative Jones asked if Idaho State University has considered using University of Idaho's patent attorneys on a contract basis to help with technology transfer. He also asked if Idaho State University has a policy in place regarding money that comes back to researchers and to the university as a result of those patents. **Dr. Wharton** said they do have policy similar to the University of Idaho's regarding patent licensing money going back to researcher. He said Idaho State University has been in negotiations with the Idaho Research Foundation, as has Boise State University, to consolidate the activity statewide. This is still in the process.

Dr. Wharton's PowerPoint presentation is available as an attachment to these minutes at: www.legislature.idaho.gov.

Dr. Chris Daniels, Director of the Idaho State University Biomedical Research Institute and professor of pharmaceutical sciences reiterated that Idaho State University is working with both regional, national and international research partners to develop their capabilities as well as to develop technology transfer. He said that for him as a scientist, technology transfer is a relatively new idea. In California, technology transfer was something he did not have to think about because it was going on everywhere. In looking at what is going on in Idaho, developing good technology transfer of ideas is critical for the economic development of the state.

Dr. Daniels said that in working with the BRIN/INBRE Program, Idaho State University just graduated the first four students with their Ph.D.'s, one in biology and three in pharmaceutical sciences. All four of those students have left for post doctoral work out of state. He said he is hoping something will be developed to attract them back to Idaho, and that the universities are working with academic partners and with private sector partners in an effort to do so.

Dr. Daniels went on to discuss the Idaho State University Biomedical Research Institute (IBRI). This is an effort to bring together, in a single focused facility, researchers that are interested in a variety of research approaches that are multidisciplinary and integrated research approaches to improved health care delivery. They are looking at developing that from the lab bench to the patient. The end goal is always the patient.

The institute is composed of 22 researchers from campus that represent six academic divisions: Pharmaceutical Sciences, Biological Sciences, Psychology, Mathematics, Engineering, and Institute of Rural Health. The research facilities in IBRI include:

- , Molecular Research Core Facility. **Dr. Daniels** explained that this is a state of the art DNA sequencing facility. It is a complementary part of the three components developed under the BRIN program where Idaho State University is involved in DNA sequencing to understand how they work and how they may change in disease states. University of Idaho is using that same technology to look at how genes are expressed and is a DNA analysis facility. Boise State University is looking at the analysis of the products those genes produce through a facility on that campus.
- , Bioinformatics Laboratory
- , Bioanalysis Laboratory
- , Biological Imaging Laboratory
- , Flow Cytometry Laboratory

IBRI research sections include:

- , Behavioral and Neuroscience. Areas being studied are:
 - C Mechanisms of brain damage in Alzheimer's disease and stroke
 - C Drug addiction and alcoholism
 - C Molecular mechanisms in genetic movement disorders
 - C Behavioral disorders from food deprivation
- , Cell Signaling and Communication which includes:
 - C Cancer biology and pharmacology
 - C Cardiovascular disease
 - C Diabetes
- , Functional Genomics and Biotechnology. This is where the Molecular Research Core Facility is located. Areas of study are:
 - C Infectious disease
 - C Molecular basis of disease
 - C Protein engineering
 - C Extremophile novel enzymes
 - C Bioinformatics
- , Health Sciences and Engineering, which includes:
 - C Biomedical signals and image processing
 - C Physiological systems modeling
 - C Medical Device development
 - C Working with partners such as the E-Med Center of Excellence at the University of Western Australia; University of Seville, Spain; Princeton Autism Technology, NJ; and AMIS, Pocatello, ID.

Dr. Daniels went on to list the roles of the Idaho Accelerator Center in bioscience and biomedical research:

- , Homeland Security: studying low-energy accelerator-produced radiation to neutralize bacterial agents (Biological Sciences, Physics, IAC)
- , Medical Imaging: enhanced medical imaging techniques using special accelerator produced x-rays. (IBRI, University of Western Australia; University of Singapore; Biomedical Technologies, Denver CO; Portneuf Medical Center, AMIS)

Dr. Daniels described an industry collaboration between the Biological Sciences and the Bioanalysis Laboratory and the Idaho Trout company to develop new omega-fatty acid rich diets from dairy cow manure to feed to commercially-grown trout to grow trout with a higher nutritional content, ultimately enhancing nutrition and heart health. This may additionally provide environmental remediation and a new market for Southeast Idaho dairy farms. He pointed out that the Bioanalysis Laboratory provides analytical support for food composition analysis to quantify the omega-fatty acid content.

Dr. Daniels said that there are capabilities across the board for drug discovery throughout the Department of Pharmaceutical Sciences and other departments. One primary focus of the IBRI is the understanding of not only the disease processes but trying to identify targets by which new drugs can be created to

effectively and efficiently treat particular disease states. They have a number of on-going initiatives in the College of Pharmacy that include:

- , Development of novel nanoparticle biomaterials for drug delivery
- , New anti-cancer agents from traditional Chinese and Central American native medicines
- , Novel anti-malarial drug

Representative Rydalch asked if they have included Native Americans in any diabetes studies. **Dr. Daniels** said that they are currently working with individuals outside of the university to provide educational programs for the Native American population. They are also looking at Native American nutrition because diabetes was not a problem for this population in the past. **Representative Rydalch** suggested that the National Center for American Indian Enterprise Development in Arizona might be good place to look for funding. She encouraged all three universities to think outside of the box for places to get research money. **Dr. Daniels** said that their Office of Research maintains one individual who has the responsibility to keep up to date on all programs and grants that are available.

Dr. Daniels' PowerPoint presentation is available at: www.legislature.idaho.gov.

Dr. John Pelton, Interim Vice President of Research and Dean of Graduate Studies at Boise State University began his presentation by describing the following statewide attributes that concern research at the three state universities. These attributes include:

- , Collaboration. Research in the biosciences at Idaho universities is collaborative and complementary (BRIN and INBRE grants)
- , University Research Environment. Universities create an optimum research environment: excellence in scholarship is prized by researchers; fundamental research is encouraged; freedom to choose the most fruitful directions; primary commitment to educating the next generation of scientists and engineers.

Dr. Pelton said that the BRIN and INBRE grants are structured in such a way that there is no single lead university. Each university took the lead in a particular area of bioscience research. In his opinion, because bioscience is so vast, no one single university could accomplish all the research that is being done.

Dr. Pelton said that Boise State University has the following assets, goals, opportunities and challenges in bioscience research.

ASSETS:

- , Faculty: 32 faculty members (from eight academic departments) in the biomedical sciences and biotechnology, most hired in the last five years. **Dr. Pelton** explained that these faculty members are from well-respected universities including Johns Hopkins, Stanford and University of Washington. Many of them come to Boise State University with backgrounds in industry or having served post doctoral appointments at respected laboratories around the country. The most remarkable thing about these faculty members is that they are very young. Almost all of them have come to Boise State University in the last five years. There seems to be a bright future for this type of research at Boise State University because of this group of young faculty.

- , Interdisciplinary approach: biochemistry, biophysics, biomaterials, biomechanics, bioinformatics
- , Specialized laboratories: AFM, EPR, MMIL, etc.
- , Collaborations: local (VAMC, MSTMRI), state (BRIN, INBRE), and beyond (TJMC)
- , Students: undergraduate and graduate research experiences

OPPORTUNITIES:

- , Growth in NIH grant funding. **Dr. Pelton** stated that since 2000, NIH funding has increased from about \$500,000 to almost \$2.5 million.
- , More educational opportunities (Ph.D. Biomolecular Science, by 2007?)

Dr. Pelton explained that the university is hoping the Ph.D. program will be in place in the next few years. He said this is something that needs to be done if they expect research to grow in this area. Major grants have been lost because Boise State University does not have a Ph.D. program in this field. **Dr. Pelton** noted that they realize it is easy to create a mediocre Ph.D. program, so Boise State University is going to focus on creating a handful of very good Ph.D. programs instead of having a lot of “so-so” programs.

- , More connections to industry; examples are Sapidyne, and Crowley-Davis
- , Enhanced communications, as Internet 2, and access grid

GOALS:

- , Align academic priorities with economic base of Boise and Idaho.
- , Prepare a scientifically and technically creative workforce.
- , Create IP with local/global application.
- , Address S&E issues of national importance.

The challenges Boise State University faces are also similar to those of University of Idaho and Idaho State University. They include:

- , Faculty salary compression (down 20%, Dean’s Distinguished Professor)
- , Startup and development of young faculty members (\$100-\$200K, timing)
- , Facilities: New/remodel
- , Marketing and licensing of IP (external)

Representative Rydahl said she applauds all of the universities for what they are doing and wants all of them to become premier research universities. She asked, with regard to facilities, what is available at Boise State University to do this research. Would it require a large scale remodel or would it be starting from scratch? **Dr. Pelton** said they are meeting next week to discuss building a small but highly flexible research laboratory of about 10,000 sq ft. At \$500/sq ft, that would cost \$5 million. They are going to try to take some of the money available for remodeling and use it for such a new facility. To do this they will also have to seek donor help. Such a laboratory would be very helpful and such a building would remain useful as larger facilities are added.

Dr. Pelton’s complete PowerPoint presentation is available as an attachment to these minutes at: www.legislature.idaho.gov.

Dr. Julia Oxford, Director of Biomolecular Research Center and Associate Professor of Biology at Boise State University, was recognized and congratulated by the chairmen for receiving the Best Researcher Award at Boise State University.

Dr. Oxford said that the programs highlighted in her presentation are both research programs and research training programs. Student involvement at the undergraduate level, graduate level and post doctoral level are all critical components of this. Since she has been at Boise State University, the atmosphere has changed and grown and has become a highly dynamic environment. **Dr. Oxford** said it is very exciting to be a researcher at Boise State University.

Dr. Oxford said her presentation will focus on health issues in the aging population, cancer, infectious diseases and the development of new diagnostics and therapies for prevention and treatment of diseases as well as new materials that will have application to medical issues and devices.

The first area of focus is on Alzheimer's Disease. **Dr. Oxford** explained that Alzheimer's disease is a neurological condition in which nerve cells in the brain die. An estimated four million people nationwide have been diagnosed with Alzheimer's disease and it is most common in individuals over 65 years of age. It is thought to be the 9th leading cause of death for this group.

Dr. Oxford said that Dr. Troy Rohn came to Boise State University in 2000 from UC Irvine to continue his research program. His work is funded by the National Institutes of Health, specifically the National Institute of Aging and National Institute of Neurological Disorders and Stroke. While in Boise, he maintains his collaborations with researchers at UC Irvine (annual budget of \$100,000 to \$200,000 per year direct costs). He is currently participating in the INBRE program. In **Dr. Oxford's** opinion, this expresses the recognition that his program has great potential.

Dr. Oxford said that Dr. Juliette Tinker joined Boise State University last year from the University of Colorado Health Science Center in Denver. In addition to studying the mechanism of toxicity, she is also developing vaccines, especially for cholera, that preserve the part of the toxin that brings certain elements into the cell and modify the central portion to provide pathogen-specific recognition. Her work has application in the area of biodefense and bioterrorism. She said this ties in with other statewide efforts in infectious diseases.

Dr. Oxford explained that Boise State University researchers have been successful in competing on a national level for funding to support the acquisition of instrumentation that is critical in order to carry out the research being done. Boise State University has chosen to focus on Proteomics and characterization of protein structure and function and how molecules interact with one another. This was chosen to be complementary with the other Idaho universities. This is due to the fact that the instrumentation is costly and the state cannot afford to duplicate it. Universities and industry share instrumentation in a collaborative fashion. BSU recently extended use of its lab facilities to New Orleans researchers in order that they could continue their work.

Dr. Oxford went on to say that Boise State University also has a research program for arthritis and rheumatic diseases that was moved in 2000 from Oregon Health Sciences. This is funded by the National Institutes of Arthritis and Musculoskeletal Diseases. The project relies on collaborations around the

country as well as closer to home, including INL, University of Idaho, Idaho State University and Boise State University's College of Engineering.

Research is also being done at Boise State University in the following areas:

BREAST CANCER

- , Studies to understand the process of cancer metastasis at the molecular level are essential in developing effective treatments and detection methods. Work at Boise State indicates that Oncostatin M facilitates angiogenesis and metastasis, an observation that is likely to change the present view of this compound as a potential therapeutic drug.

IMMUNE SYSTEM AND INFLAMMATION

- , Boise State University researchers study how regulators of the immune system contribute to the pathogenesis of asthma. Beta-adrenergic agonists found in common asthma medications alter the regulation in asthma subjects compared to healthy control subjects.

ATHLETIC INJURIES

- , The incidence injuries to the anterior cruciate ligament (ACL) is four to six times more common in female athletes than in male athletes. BSU researchers are examining the neuromotor strategies, specifically anticipatory postural adjustments when landing, using sEMG and motion analysis data. BSU researchers are also studying the biomechanics of human joints in both normal and pathological function to give an understanding how movement results in joint stresses and injuries.

TISSUE ENGINEERING FOR ORTHOPEDIC REPAIR

- , A multidisciplinary team at Boise State is developing a process to create custom-shaped skeletal structures. MRI or CAT data with rapid prototyping technology is used to produce 3-D models of skeletal structures. A biocompatible polymer scaffolding of the same shape could then be inoculated with living cells to create artificial tissue for implant to repair losses due to osteoarthritis or injury.

BIOCOMPATIBLE MATERIALS

- , Boise State University researchers are developing:
 - C biocompatible polymeric gels that can be used to prevent post-surgical adhesions and can be used in the extended release of pharmaceuticals.
 - C polymeric scaffoldings to be used for artificial blood vessels used in vascular and cardiac surgery.
 - C antimicrobial polymers that can be used to coat implantable medical devices.

NEURAL DEVELOPMENT AND RETT SYNDROME

- , Boise State University researchers are examining the role of methylated DNA-binding proteins as a cause of the insufficiency in neuronal maturation that is manifest as Rett Syndrome.

DRUG DEVELOPMENT: CANCER CHEMOTHERAPEUTICS

- , Anthracyclines are cancer chemotherapeutics that have irreversible, cumulative cardiotoxicity side effects. Structural analogs of anthracyclines with reduced cardiotoxicity are being developed at Boise State.

Basic research into the mechanism of cardiotoxicity includes focus on enzymatic pathways and on calcium regulation by calsequestrin in the heart. These efforts may lead to prevention of cardiotoxicity.

Dr. Oxford explained that this is not an exhaustive list of the research going on at Boise State University. Her presentation focused on the last five years to demonstrate the growth the university has undergone and the areas of research for which there is expertise and in which Boise State has made an investment. She said that Boise State University recognizes the importance of research to its future and has made it a priority.

Dr. Oxford's PowerPoint presentation is available as an attachment to these minutes at: www.legislature.idaho.gov.

Mr. Phil Syrdal, BioIdaho, spoke to the committee regarding the minutes from the July 27, 2005, meeting. He said that he had used the term "blackhole" and that it was an unfortunate choice of words to use because he was not referring to Boise State University. He was referring to the way Boise linked into the state's research network. He said that historically, Boise has not been the primary player. He wanted to clarify this at today's meeting for the record. He said he is very excited about developing great young researchers at Boise State University, and in fact, he said he has put a great deal of time into helping with the BRIN/INBRE grant support for Boise State University.

Following a break for lunch, **Dr. Denny Stevens, Director of Research and Chief of Infectious Diseases, Veterans Administration Research** posed the following are three questions for the Idaho Legislature to consider:

Why should the State of Idaho be involved in the federally-funded Veterans Administration Medical Center (VAMC)?

What are the relationships between the VAMC and institutions of higher learning in Idaho?

What can Idaho legislators do to enhance research activities throughout the state of Idaho?

Dr. Stevens said that he wanted to speak about academic issues as well as research. These include teaching, patient care and research goals. The primary mission of the VA is to provide excellent patient care to veterans. Secondary goals involve teaching of medical students, nurses, respiratory therapists, and new physicians as well as research.

Dr. Stevens said that in 1975 the VA became affiliated with the University of Washington which really developed a good academic spirit at the hospital. In 1997, the VA saw an average of 9, 000 patients. In 2005, that has increased to 19,000 patients. He explained that each one of these patients has a primary care provider at the Boise VA. In 2005, they had 170,000 outpatient visits, and with soldiers returning from Iraq, that number of visits will also grow.

The affiliation with the University of Washington started with the WAMI program. The Boise VA serves as a training site for WAMI students in their third and fourth years of medical school. They have trained 385 medical students since 1975. He explained that the University of Idaho provides training for first year WAMI students.

Dr. Stevens said that the Boise VA also has an affiliation with the University of Washington in primary care internal medicine and has graduated 200 physicians from that residency. Sixty interns have also graduated from a transitional year internship program. Family practice residents spend two years doing primary care/internal medicine at the Boise VA.

The teaching of WAMI students and primary care residents at the Boise VA involves a very organized program that includes:

- , Didactic lectures
- , Clinical conferences
- , Daily noon conferences, Grand Rounds by VAMC faculty
- , Daily attending rounds (VA faculty, WAMI students, U of Wash. residents)
- , Subspecialty rounds
- , Clinic rotations daily

Dr. Stevens stated that there are 51 practicing physicians in the Boise area that are graduates of the Boise VA program, with other graduates in Wyoming, Montana, Eastern Washington and many in the Seattle/Tacoma area.

In addition to the University of Washington, the Boise VA has affiliation with Idaho institutions. He said there are four full time Idaho State University faculty at the VA whose salaries are paid by the university.

Dr. Stevens said the Boise VA has a number of affiliations with Boise State University including:

- , Respiratory therapy students
- , Nursing students
- , Collaborations with BSU researchers

The University of Idaho's affiliation is long standing with the Department of Microbiology largely because Boise State University does not have a graduate program in microbiology. **Dr. Stevens** said he took it on himself to figure out how to have graduate students at the Boise VA in Idaho. In order to do this, the University of Idaho provided the infrastructure with students spending one year there doing basic science work and spent the rest of the graduate career at the Boise VA. Five students have graduated and there is currently one Ph.D. candidate in that program. He added that Boise State University professors have been on those graduate committees and there has been a very good relationship.

Dr. Stevens went on to explain that basic science research currently active at the Boise VA includes:

- , Cellular mechanisms of shock and pathogenesis of infectious diseases
- , Mechanisms of vascular injury
- , Cardiomyopathy of anthracyclines
- , Pulmonary physiology
- , Geriatrics

In addition to basic science research, clinical trials are also performed at the Boise VA. This research

includes:

- , Infectious diseases and research on three antibiotics: Iclaprim, Tigecycline, and Linezolid. These three antibiotics have all been developed in the last year or two. **Dr. Stevens** said that he is the principal investigator for a worldwide clinical trial with Iclaprim that was developed by a Swiss pharmacist.
- , Hepatitis C: Pegylated INF and Ribavirin. **Dr. Stevens** said that about 8% of the Boise VA patients have Hepatitis C and they have been able to cure about 90% of patients in those clinical trials.

Dr. Stevens listed the clinical teams at the Boise VA. These are available in his complete power point presentation that is available as an attachment to these minutes at: www.legislature.idaho.gov. These teams work in infectious diseases, pulmonary studies, geriatrics, cardiovascular studies, diabetes and neuropsychiatry.

Dr. Stevens said they want to enhance research efforts at the Boise VA in areas including clinical research. He said this will be done as follows:

- , Team approach
- , Computerized patient records Boise VAMC
- , Access to VA national database
- , Recruitment of an epidemiologist/statistician with expertise in design of clinical studies
- , Evolution of a University of Washington IRB specifically for VA studies

Dr. Stevens explained that there is a proposal in place to develop a transitional research program at the Boise VA to bridge the gap from science to the bedside, and involves:

- , In vitro and ex vivo cellular studies: mechanisms of action, toxicity
- , Signal transduction
- , Gene expression
- , Polymorphisms (TNF, Beta-agonists)
- , Proteomics
- , Expression of known proteins (arrays)
- , Identification of novel proteins
- , 2-D gel electrophoresis/Mass spectroscopy
- , Identification of novel mechanisms of action, cellular toxicity, etc. which will provide markers that can be pursued in patient based studies. **Dr. Stevens** said this can be done by identifying patients using both the Boise VA patients and national VA database.

Dr. Stevens said they want to develop a Biomedical Research and Education Institute at the Boise VA. This would be a new building that would allow:

- , Expansion of research space and equipment
- , Enhancement of research collaborations with Idaho universities and investigators

Expansion of teaching facilities, classrooms and conferencing capability including teleconferencing with Idaho universities and the University of Washington

Dr. Stevens stated that the Idaho Legislature can help promote research activities by:

- Reinstating the small research grants administered through the Higher Education Research Council (HERC)
- Increasing the number of Center of Excellence grants through HERC
- Increasing the number of graduate student stipends at the universities
- Utilizing Tobacco Fund moneys for biomedical research in Idaho
- Establishing joint graduate degree programs utilizing faculty at all the universities and the Boise VA

Senator Schroeder asked how it would be possible to fashion the small research grant program so that it has the continuity to protect academic freedom and satisfies the wishes of the legislature regarding funding from HERC. **Dr. Stevens** said that it would have to have very broad goals. HERC has tried very hard to focus the intent of such a program. The grant that caused the problems was based on social sciences and some of the liberal arts have been excluded by HERC for these grants. They have tried to focus these grants on science and technology that would enhance the economics of Idaho. **Senator Schroeder** clarified that this means leaders within HERC would have to be willing to work with the legislature to place some sideboards on what could be expected from those grants. **Dr. Stevens** said that was correct, but added that once the grants are submitted, they are sent out for external peer review. **Senator Schroeder** suggested that this might be an area that the task force could look at, to recommend reinstating these grants under a new structure for the awarding of the grants. In his opinion, it is counterproductive to have a program that stops and starts without continuity or certainty.

Representative Jones said that he is assuming any new research facility at the Boise VAMC would that be built from federal money. He asked how far along they are with funding for that and if there is a way the State can support it, as with a letter from the task force or a resolution from the legislature. **Dr. Stevens** said that he has met with research people at University of Idaho, Boise State University and Idaho State University as well as people from Senator Craig's office. Everyone likes the idea. **Dr. Stevens** said that since Senator Craig, due to his position in Congress, has influence over VA operations, this would be a valuable asset for the State of Idaho and veterans. He said there is not actually a building plan but all of the principles are in place to get started. **Dr. Stevens** noted that a letter from this task force would be of benefit for them and would be forwarded along with other documentation that will be submitted. He added that while federal dollars would be used to build the facility, the state could actually play a role in providing funding for equipment and other materials. **Representative Jones** asked that as this moves forward, they keep the legislature informed because the legislature could pass a resolution of support to send to Senator Craig and others.

Representative Rydalch asked if the possibility of a new building would detract from existing needs or create competition with other research needs at the Boise VA. **Dr. Stevens** said no, this will be used to enhance research efforts. He said there is a need to dramatically renovate the research facility anyway, so this would not cause any problems.

Representative Rydalch asked if replacement equipment would come from federal funding. **Dr. Stevens** explained that it is easier to get federal money for buildings. Funding for equipment is more difficult and they need to find more creative ways to get funding for it.

Dr. Stevens' PowerPoint presentation is available as an attachment to these minutes at: www.legislature.idaho.gov.

Dr. Theodore Walters, Director of Clinical Research at Mountain States Tumor Institute (MSTI) and Director of the Mountain States Tumor and Medical Research Institute (MSTMRI) at St. Luke's Regional Medical Center responded to a question regarding an Idaho medical school by saying that to be able to support a medical school, the population of a state needs to be about 3 million people; Idaho is not ready for that yet. On the other hand, while Idaho does not have a medical school, it is felt by doctors that we still need the latest science/technology for our patients.

Dr. Walters explained that in 1969, Dr. M. Burkholder began MSTI for the purpose of providing specialized cancer treatment and drug therapy. Clinical cancer research started there and at St. Luke's Hospital. This research has many benefits:

- , Keeps doctors informed on newest information
- , Provides the best new treatments for our patients
- , Provides access to the most current drugs
- , Allows doctors to be part of a national research process

Dr. Walters said that as part of the national research process, MSTI developed formal research departments for adult and pediatric cancer research. They became affiliates with oncology groups including the Southwest Oncology Group, Cancer Trials Support Unit, and the Radio Therapy Oncology Group. They also joined national studies such as Prostate Lung Cancer and Ovarian, Select and National Lung Study Trial. MSTI also recruited pharmaceutical company trials.

Currently MSTI has 80+ trials for all major types of cancers. They try new chemotherapy drugs and new combinations of older drugs. They also have a program for doing bone marrow "transplant." This is where a person's bone marrow is removed, the patient is given an almost deadly dose of chemotherapy and radiation, and then the patient's own bone marrow is reintroduced. They are also looking at new ways to administer radiation.

MSTI and St. Luke's have looked for donations for basic science research and for ways to cooperate with other institutions because one single institution cannot do the best job; everyone needs to work together. After receiving input from physicians, the Mountain States Tumor and Medical Research Institute (MSTMRI) was formed. The purpose of MSTMRI is to support, conduct, and foster basic and clinical biomedical research and provide research opportunities for Idaho clinicians, basic scientists and students. St. Luke's also received a very nice endowment from a local philanthropist who specified that the money is to be used for scientific research.

MSTMRI staff includes:

- , Ted Walters, MD - Director, MSTMRI

Hematologist/Oncologist
Director of Clinical Research, MSTI

Richard Olson, Ph.D. - Associate Director
Scientist, Pharmacologist, Boise VA Hospital
Assoc. Professor, U of WA Med School

St. Luke's provides the office space, personnel, the administration and most of the funds and does the clinical trials on patients. The Boise VA provides the basic science laboratories. Even though, as Dr. Stevens said, they are somewhat limited, they are the best that is available. The VA also has an animal facility that allows testing on animals.

Dr. Walters explained that MSTMRI has scientists from Boise State University, Idaho State University, Albertson College and Northwest Nazarene University. He said the University of Idaho has not been as involved because they have WAMI with the University of Washington.

He said that MSTMRI is not limited only to cancer research. They have administered an Albertson Foundation education grant in science for grades K through 12 that lasted for three or four years. They support research on aging, cardiovascular and infectious diseases as well as supporting other sciences such as biochemistry and psychology.

Other MSTMRI activities include:

- , Administer grants, awards, and donations
- , Burkholder Lectureship, which brings nationally known speakers such as James Doroshow, M.D.
- , Provide student research fellowships
- , Increase medical school admissions
- , Expose students to working science
- , Provide scientific small-project grants
- , Allow for expansion of projects
- , Bring in larger amounts of research grant money
- , Provide bridging funds to scientists
- , Keep scientists in the region
- , Help bring in new researchers

Dr. Walters said that MSTMRI plans to:

- , Seek additional grants, donations, etc.
- , Work with other organizations such as BioIdaho
- , Help to develop expanded research facilities
- , Expand scientific education and sharing of knowledge

Dr. Walters said that in his opinion MSTMRI will provide the following for Idaho in the future:

- , Better patient care
- , Better education for our professionals

- , Better recruitment of scientists
- , Better recruitment of biotech companies

Representative Rydalch asked for clarification of the difference between the Biomedical Research Institute at the Boise VA that Dr. Stevens discussed and MSTMRI and whether those would be a duplication of facilities or be competing against one another. **Dr. Walters** said that he did not think there was any problem, that in fact, they support one another, and there is room for more than one provider, especially as the population grows and more biotech companies come to Idaho.

Representative Rydalch said that she was sorry to hear that it takes a population of 3 million to start a medical school. **Dr. Walters** explained that medical schools turn out to be inordinately expensive because of the equipment they use and due to the fact that the training of doctors means money is going out, not coming in.

Dr. Walters' PowerPoint presentation is available as an attachment to these minutes at: www.legislature.idaho.gov.

Dr. Timothy Sawyer, Director of the Cancer Care Center at St. Alphonsus Regional Medical Center, is also a radiation oncologist and the founder of a very small biotech company in Boise, ImQuant, Inc.

Dr. Sawyer explained that St. Al's is a 300 plus bed hospital in Boise with over 500 physicians on the medical staff. The cancer center itself employs six physicians and two nurse practitioners. Among St. Al's clinical research assets are:

- , The IRB is currently monitoring 61 studies
- , Idaho Neurological Institute is currently monitoring 10 exempt studies
- , Multiple small non-monitored studies not involving patients, are in process
- , There are two federally funded telemedicine studies through TATRC, TeleBabyDoc and CHF.

Study types range from cardiac device; cardiac drug; neuroscience primarily related to brain injury; sleep disturbance and seizure disorders; oncology; and telemedicine.

Dr. Sawyer explained that currently St. Al's is a community care hospital, not a research institution. He said that many physicians have interest in changing that and the administration is also interested in increasing the research presence. He said currently there is the opportunity to combine the expertise and resources of the large, Boise-based hospitals with the patient numbers to conduct large-scale clinical trials. He added that by using the universities and private industry, they can do some meaningful, impacting research.

Dr. Sawyer discussed an example with which he is currently very actively involved. He said that oncology at St. Al's is focused in the two areas of individualization of cancer therapy; and image quantification. In present-day oncology, unfortunately, patients with identical diagnoses receive identical treatment, even though we know that they are likely to respond very differently. Also, image data are used to make pictures. **Dr. Sawyer** said they think there is a way to use this data better to begin to individualize cancer therapy.

Dr. Sawyer explained that everyone that has colon cancer, after resection, receives the same number of cycles of triple agent chemotherapy. Some of these patients improve their chances of long term survival by about 5%. There is great emphasis on attempting to figure out how to improve that ratio and to give patients therapy that is specific to their tumor. This approach can also be applied to other forms of cancer.

One key approach to individualization that is receiving funding, is the science of genetic and molecular profiling. These studies profile an individual tumor with the likelihood of responding to a particular chemotherapy regimen.

Dr. Sawyer explained that ImQuant's approach is slightly different. They use image quantification techniques. Instead of making images out of imaging data, they try to figure out how to quantify that data. They image a patient before treatment and during treatment and begin to use the tumor to tell them mathematically how well it is responding and will continue to respond to treatment.

Dr. Sawyer gave the following background and philosophy of ImQuant, Inc.

- , It was founded by a Saint Alphonsus radiation oncologist.
- , The initial concept recently accepted for presentation at annual meeting of the Radiologic Society of North America (Chicago, December 2005).
- , In August, 2005, they signed a research and development agreement with Mayo Clinic image engineering lab to develop prototype software that will allow them to do the research.
- , Clinical trials are currently being written at Saint Alphonsus and the Mayo Clinic.

In looking for an engineering team, **Dr. Sawyer** said he went to the Mayo Clinic but he realized that the talent to do much of this work exists here in Idaho. As a result of that, he is negotiating a 4-entity consortium with Boise State University and Idaho State University engineers, Saint Alphonsus and ImQuant. They are also in preliminary discussions with the INL, and they are talking to the staff of both Idaho U.S. senators about getting federal appropriations to continue this consortium-based work.

In conclusion, **Dr. Sawyer** said the inclination was to look out of state and he did so. On the other hand, the engineering talent to do this type of work exists here in Idaho, and the hospitals in Boise are large enough to conduct large-scale clinical trials.

He said one problem is that the university-based engineers and researchers, as well as the major hospitals, are not organized such that multi-institutional collaboration is efficient; it took a lot of effort to develop this consortium. In his opinion, having a well-coordinated and well-funded research institute in Boise will allow the recruitment of very high caliber clinical and research physicians who want to leave places like Seattle, Los Angeles, and San Francisco. It will allow them to conduct meaningful and impacting research in Boise and will make Boise attractive to start-up technology companies.

Representative Jones asked what the legislature can do to help the universities and hospitals in the area become more organized to do research in a collaborative manner. **Dr. Sawyer** said that a centralized and perhaps independent research institute that Mr. Syrdal has discussed would be a good starting point.

Dr. Sawyer's PowerPoint presentation is available as an attachment to these minutes at:

Dr. Richard Olson, Chief Science Officer of Gem Pharmaceuticals and Chief of Cardiovascular Pharmacology, Veterans Administration Medical Center, began his presentation by discussing some of the events and frustrations he experienced in developing a biotech company in Idaho. There is an anti-cancer drug that is used today, all over the world, that has side effects on the heart which requires limiting each use in treating the cancer. Certain doses cannot be exceeded and certain durations of treatment are limited for fear of its effect on the heart or its interaction with other drugs used to treat cancer.

Dr. Olson said that he has been interested in this problem for a number of years. They have been investigating the mechanism of how the anti-cancer drug causes heart injury since 1977. He said that since 1984, when he came to Idaho, this work has been supported by the VA Medical Center and MSTMRI Research Institute of St. Luke's. MSTMRI's contribution, not only to the development of this drug, but to the research that has been conducted at the VA and other institutions in the area, has not been adequately told. He said they have been a very viable source for promoting this research. Both of these institutions have supported this concept and that led to the development of the understanding of how this drug effects the heart.

Dr. Olson said that his motivation for being involved in drug development is first, because he is a pharmacologist, and second, because he was able to receive a soft money salary to do the research. He explained that soft money salaried researchers are always looking for other sources of funding, and he was no exception.

About the time these drug discoveries were made, NIH established grants specifically for drug development by small companies called Small Business Technology Transfer Research grants (STTR) and Small Business Innovative Research grants (SBIR). These grants allow small companies without sophisticated research facilities to combine with large, established research programs such as universities and research institutes, to do some of the basic research needed to develop new drugs.

Dr. Olson said that following disclosure to the VA Medical Director, advice from VA legal counsel and his reduction from full time to part time status, in 1996, Gem Pharmaceuticals, Inc. was formed and it began operation in Idaho. Early on they ran into the following problems:

- , No infrastructure in Idaho to support the fledgling research company
- , No research labs to lease
- , No animal research facilities
- , No scientific equipment
- , Investors didn't believe biotech could be successfully performed in Idaho without a medical school or sophisticated biomedical infrastructure

Due to these problems, there was pressure to move out of Idaho; Gem Pharmaceuticals moved its corporate headquarters to Alabama where it leased a small research lab to perform chemistry, regulatory functions, etc. The NIH supported research was still performed at Boise VA medical center through grants administered by MSTMRI. **Dr. Olson** reiterated how valuable MSTMRI and the VA Medical Center have been to the development of this drug through these grants.

The outcome of this research performed by Gem led to FDA approval as an investigative new drug and the new drug has completed Phase I clinical trials at the Mayo Clinic. It is currently in Phase II clinical trials for evaluation of efficacy in treating metastatic breast cancer.

Dr. Olson added that even though this company faced difficulties, Idaho, MSTMRI and the Boise VA have had tremendous impact on the development of this drug. He said that hopefully they will be able to treat breast cancer and other forms of cancer as a result of the research that has been done in Idaho.

Representative Rydalch asked if there is anyone else in the nation working on the cardiovascular research Gem is doing. **Dr. Olson** said that there are others working on the mechanism of this class of drugs and the toxicity of the heart that occurs. He has been working on it since 1977 when he was at Vanderbilt University and has been in the forefront of it since then. The particular changes in the molecule that Gem made to this drug development are unique, and except for what has happened in Idaho, no one else has gone forward to develop the drug.

Representative Bolz asked if the “climate” has changed in Idaho and whether he would try to start a company in Idaho today. **Dr. Olson** said he is still hoping parts of the drug can be kept in Idaho. He reminded the task force that the company is not making any money yet. They hope to get permission from the FDA to sell the drug and at that time there will be a lot of competition for them to locate elsewhere. He said that development of a centralized research facility in Idaho would help companies like Gem stay in Idaho. Such a facility would allow companies to use equipment, animal facilities and still retain their proprietary information and status. That is more difficult to do at a federal facility or university.

In response to a follow-up question from **Representative Bolz**, **Dr. Olson** said that the environment in Idaho is secure in terms of bioterrorism threats or picketing against animal testing than elsewhere because we are relatively small. In his opinion, there are other places to choose if someone wants to get that kind of attention.

Senator Coiner asked what the span of time is to get investors and to create drugs. **Dr. Olson** said it varies as to how successful a project is in attracting investors to the company. His project has been in progress for about ten years and will probably, if they are successful in their research, take at least a total of 15 years, from starting to getting the drug to the public domain. He said that 10 to 15 years is probably a pretty good estimate for all drug development and it is very expensive.

Dr. Olson’s PowerPoint presentation is available as an attachment to these minutes at: www.legislature.idaho.gov.

Mr. David Smith, Director of Marketing and Business Development, Sapidyne Instruments, Inc., stated that biotechnology, as a total subject, is very broad. In the case of Sapidyne, they are an instrument company. Their instrument, called KinExA, helps drug companies discover new drugs and find which ones will work best. He described Sapidyne Instruments, Inc. as follows:

- , Profitable commercial enterprise, employee and investor owned
- , Purpose is design/develop/manufacture scientific instruments
- , Founded in Boise - 1995 because of the quality of life here

, 15 employees USA – undergraduate through Ph.D.+
, Wholly owned Japanese subsidiary - 2004
, Customer base in USA, Japan, Korea, U.K., Canada

Mr. Smith said that the company's markets are mainly in the life sciences area dealing with drug discovery. He said that the environmental market is also becoming of interest and an area where they see a much broader application of their technologies. They are also exploring collaborations with companies for clinical diagnostic products that will use a process to look at chemicals in the bloodstream. He noted that there is some testing going on using their products to test for different drugs and vitamins in raw milk products.

Sapidyne's customers include many of the leading biotech, pharmaceutical, research and academic institutions in the world.

Mr. Smith noted that researchers they work with at Tulane and Xavier Universities in New Orleans who have been washed out of their homes, are being welcomed to Boise State University to use their facilities to continue their research.

Mr. Smith said that Sapidyne's vision is to create an organization that develops high-value scientific equipment with best-in-class technology; their first instrument has done this. Using this commercial instrument, the following questions can be answered:

, How TIGHTLY does the drug bind its target?
, How FAST is the drug binding to its target?
, How LONG does the drug stay bound to its target?

Mr. Smith noted that about 18 patents on this instrument are held in the U.S. and internationally. Market opportunities for the industries his company serves include drug discovery, environmental testing, and medical diagnostics.

Mr. Smith said that they have recently met with people at the University of Idaho regarding use of their technology for use in research being done regarding clean-up at INL and mining sites up north.

Mr. Smith said that as a company they are trying to figure out how to do things faster and for less money. In response to **Representative Jones** question about how long it takes a drug to get to market, he said the average is about 14 years and takes hundreds of millions of dollars. Sapidyne's instrument is helping drug companies find the target drugs more quickly, thus saving time and money in the process.

With regard to environmental testing, Sapidyne has been working with a Japanese company which is testing dioxin and PCB's. So far, the technology has shown best-in-class performance in a screening model for dioxins in water, soil, gas and ash. He said the interesting thing for his company is that the relationship and technology is a direct result of research and collaboration with government, industry and universities. Now they have an instrument that can measure dioxin and PCB's at a much higher level of sensitivity than before. This speeds up the time for remediation of soils and reduces the cost to do that.

Mr. Smith stated that accuracy is also very important to Sapidyne. They try to create very accurate instruments that are both sensitive and can be reproduced.

Industry “growth drivers” and areas where the legislature can help Sapidyne and other biotechnology companies include:

- , Skilled labor pool: B.S., M.S., Ph.D.’s in chemistry, biology, microbiology, biochemistry, physics and math
- , Significant increase in number of bioscience professors and research at Boise State University
- , State office that breaks down barriers and knows key players in the federal agencies that affect biotechnology
- , Mandate and fund increased math and science curriculum in schools, beginning with junior high

Mr. Smith stated that much of what happens in biotechnology is a direct result of what comes out of university research. Almost all of the spin-off companies start at the research level in universities. He said there is a need for more research to be done at Boise State University; they applaud those initiatives to enhance that research. University of Idaho does quite a bit more research and they are doing great things, but more needs to be done.

He said Sapidyne sources worldwide for its employees. Many of the Ph.D.’s they look for are foreign trained and educated because they seem to have the interest in science and math. He encouraged the task force to look for opportunities to help increase that interest in young people.

In looking at Idaho’s core competency, he noted that there are advantages to being in Idaho because it is a good place to live and raise children, and has fair housing prices. He said that most of their customers know Idaho only for its potatoes; otherwise, Idaho is an unknown quantity. **Mr. Smith** said they would choose to locate in Boise if they were to do this over again.

Sapidyne’s wish list includes:

- , Consolidation of energy and money toward biotechnology research in life sciences and medical diagnostics
- , Establishment of one system for research to ensure cooperation and collaboration at the university level
- , Creation of a biotechnology incubator with a core lab facility
- , Mandating and funding increased math and science curriculum in schools, beginning with junior high

Senator Schroeder said that when he hires someone to work for him, he does not care where they come from, as long as they are qualified. He asked if **Mr. Smith’s** company finds any specific country that has more qualified applicants than others. **Mr. Smith** responded that they have more foreign born customers than U.S. born customers but he is not sure about the employees.

Senator Schroeder said that when someone is young, after graduation, they usually do not want to stay in the same city where they grew up. He asked how providing these jobs will make these people want to stay here. **Mr. Smith** stated that most Ph.D.’s follow the research when deciding where to do their post

doctoral work. The more research opportunities that are available in Idaho, the more likely they are to stay in the state. He added that having Ph.D. programs in the state that offer interesting research is another way to get these young people to stay. Many Ph.D.'s end up working in very close proximity to where they did their doctoral work.

In response to a question from **Senator Marley**, **Mr. Smith** said the collaboration of research in Idaho is the same as anywhere else. It is just that Idaho is so small with limited resources, being able to direct the resources to one location that could then direct the research done, would seem to be a more effective model to use. He stated that he was impressed with the amount of good science being done at University of Idaho and Boise State University. Unfortunately, not many people know about it.

Senator Fulcher asked if there are areas within the biotechnology industry that, for investors, would have shorter period of time to show a return on investment. **Mr. Smith** explained that in his opinion, investment in biotechnology is riskier than other types of technology investments due to the long time frame involved in getting drugs to the market. The return on investment, though, can be much greater; one is not dealing with a commodity such as microchips. Biotechnology tends to have much higher gross margin levels and tends to trickle down to more profitability once the product is on the market.

In response to another question from **Senator Fulcher**, **Mr. Smith** said that he is not an expert on agricultural bioscience, but that in the areas of life sciences and environment, there is a huge return on investment.

Senator Schroeder asked how the development of a biotechnology incubator center and the establishment of one system for research to ensure cooperation and collaboration at the university level, fit together. **Mr. Smith** said this does not necessarily mean building a new facility. In his opinion, there is opportunity to use existing resources to allow multiple companies to do multiple tasks without getting in each other's way. **Senator Schroeder** observed that the question is how to use the expertise available in the state to its fullest, without letting regionalism or politics get in the way. **Mr. Smith** said that regionalism is an issue because it is not an easy trip for a Boise-based company to travel often to the University of Idaho to do its research.

Mr. Smith's PowerPoint presentation is available as an attachment to these minutes at: www.legislature.idaho.gov.

Dr. Xavier Danthinne, President of O.D.260, Inc. explained that O.D.260, Inc. is a biotech company with five employees. The company occupies 1,700 square feet in a state-of-the-art facility in SE Boise next to Micron. Their mission is to become a leader in the development and sales of innovative tools for biological research. He said he agrees with the view that the 21st century is going to be the century of biotechnology. Completion of the sequencing of the human genome a few years ago is just one of the numerous examples of the tremendous progress that has been made in the last two decades.

Dr. Danthinne stated that to do biological research, tools are necessary. In the U.S. alone, the tool market is estimated to be between \$5 and \$10 billion per year. It is thought that even a small company like O.D.260 with good ideas that can improve existing methods, will be able to take a piece of that pie.

O.D.260 markets two technologies:

1. Adenovirus-based vectors for gene transfer. This technology is used in gene studies, gene therapy, and in vaccine development.
2. Detection and analysis of promoters. **Dr. Danthinne** explained that a promoter is a switch that regulates the expression, on and off, of genes. Not all genes in the human body are expressed at the same time. He said that currently there is no easy approach to analyze and detect those promoter sequences. His company is developing a unique high-throughput method to discover and analyze gene switches. He invited any task force members who want more information to visit their facility for a tour.

Dr. Danthinne said that today O.D.260 is primarily a research and development company doing research on the above projects. In addition to that, they offer services that include adenovirus custom cloning, and promoter analysis. The company also sells tool kits that are made from reagents that are necessary to perform the above functions.

The company's short term plan includes development of a functional web site with e-commerce capability from which they will launch their products and provide custom services. This will go along with an advertisement campaign. They will also submit another application for federal funding for continuation of their research and development activities. He stated that each submission fosters new collaborations with universities in the United States. By the end of the year, they should have at least one patent application submitted.

The long term plan is that they still want to develop tools for molecular biology. They plan to increase their market share through diversification of product lines. O.D.260 hopes to develop new partnerships and to license their technologies to other companies. They also expect to hire at least three more employees by the end of 2006.

Dr. Danthinne gave the following time line in the formation of O.D.260, Inc. He said the idea first came to him when he was at the University of Michigan.

, Mid 90's : an idea
, 1999 : Incorporated
, 2001 : SBIR Phase I
, 2003-2004 : investment ~ \$ 450K
, 2004 : SBIR Phase II
, 2004 : a Home!
, 2005 : SBIR Phase I

The resources of the company include:

, Education (4 Ph.D.'s + 1 M.S.)
, Experience (70+ years in molecular biology)
, SBIR program (NIH: 2 x Phase I + 1 x Phase II)
, ISBDC/TECenter (Burt Knudson, Rick Ritter)
, Economic downfall for others mean opportunities for us

, Personal saving accounts
, They have received more than \$1 million in grants since 2001.

Dr. Danthinne said O.D.260 brings the following to Idaho:

, Employment
, High-value technologies
, Collaborations with experts worldwide (Idaho, US, Europe, Asia)
, Help for others (“we have been there”)

In **Dr. Danthinne’s** opinion, Idaho should do or continue to do the following in order to create or attract biotechnology businesses to the area:

, Support basic science, to foster new ideas, which will create new products and business opportunities
, Get a technology incubator with biotech capabilities
, More flexibility from institutions
, Leadership
, Support from State Representatives and Senators

In response to a question from **Senator Schroeder**, **Dr. Danthinne** explained that their company name, O.D.260, is a term used in biotechnology. Even if the company should change its focuses over time, the name will continue to be appropriate.

Dr. Danthinne’s PowerPoint presentation is available as an attachment to these minutes at: www.legislature.idaho.gov.

Dr. John Tracy, Director of the Idaho Water Resources Research Institute, explained he will discuss development of an integrated water resources program and water resource management for developing economies. **Dr. Tracy** said that the vision is to make Idaho the intellectual hub for graduate education in water resources management and a world leader in providing water resource management solutions. To develop this opportunity would create an economic driver for the state.

He said that before he came to Idaho, he was the director of a watershed research center at the Desert Research Institute in Nevada. The institute was autonomous from the state universities. It was funded entirely with soft money; everyone had to get their own funding. This allowed them to create research programs in areas where the state lagged behind. It also instilled an entrepreneurial spirit in the faculty because they had to find the research and funding themselves. In other words, the faculty had to actually go out and create a market for the research. It worked very well except for the fact that they were competing with the other universities in the state, and it did not allow them to leverage the educational research opportunities in Nevada.

In his opinion, starting with graduate education and using that to spur both research and development and entrepreneurship, leads to the growth of new markets, industries and businesses. “Throw in capital development,” and new exportable products can be created.

Dr. Tracy said that in water resources today, these products are technological in nature as well as intellectual. The intellectual products that can be produced in Idaho, in relation to water resources, are beyond what is being done in water resources research. Primarily today, persons with a Ph.D. in water resources are analysts. They analyze the problem but don't solve it. He said the next phase should be to develop graduate students in water resources that are problem solvers. Doing that will create a new market for water resources research worldwide. Existing assets which can be used to accomplish this include:

UNIVERSITIES

- , University of Idaho
 - C Water Resources/Hydrology Graduate Education in Colleges of Natural Resources, Science, Engineering, Agriculture and Law
 - C Ecohydraulics Research Center - Idaho Water Center
 - C Aquaculture Research Institute - Hagerman
- , Idaho State University
 - C Established program in River Ecology
 - C Emerging program in Water Resource Decision Support
- , Boise State University
 - C Established program in Public Policy
 - C Linkage to Andrus Center for Public Policy
 - C Emerging program in hydrologic sciences and biosensors
- , Idaho Water Resources Research Institute
- , NSF EPSCoR Water Resources Research Initiative

RESEARCH ORGANIZATIONS

- , Idaho National Laboratory
 - C Regional Leader in Energy - Water Nexus Issues
 - C Extensive research and experimentation in groundwater flow, contaminant transport and mitigation
- , United States Geological Survey
 - C International leader in water monitoring, data archiving and real-time data delivery
 - C State headquarters are in downtown Boise
- , U.S. Forest Service - Aquatic Research Laboratory
 - C National leader on interaction of land management with aquatic habitats
 - C Co-located in the Idaho Water Center with the ERC and IWRRI

INTERNATIONAL COMPANIES

- , Washington Group
 - C Extensive experience internationally in infrastructure development
 - C Extensive experience in infrastructure development for environmental and water resources management
- , CH2M-Hill
 - C National leader in municipal water resources infrastructure planning, management, design and operations
 - C Expertise to develop and implement projects in a wide range of international settings
- , Idaho Power

- C National leader in hydropower production
- C Expertise in working in international venues

Dr. Tracy stated that the gaps that exist include:

- , The lack of programs that embed entrepreneurship into the curricula.
- , The mechanism to integrate activities and efforts across university, agency and private company platforms.
- , The mechanism to promote and reward faculty, researchers, scientists and engineers that actively pursue joint collaborations.

Dr. Tracy said that in the end, for this last point, most of these people are not going to get huge rewards for helping create a company started in Boise; these groups get rewarded for publishing research papers. The incentive structure within universities is one of the problems. Rewarding the team in this arena does not currently exist.

Dr. Tracy stated that the first point above, on embedding entrepreneurship into the curricula, is also very important. When water resource professionals are being educated in Idaho, besides getting the best science education, they also need to have the knowledge on how to create a new market or business, otherwise they are more likely to go somewhere else to work.

Senator Schroeder asked to what extent scientists talk with people at the schools of business. **Dr. Tracy** said this does happen to some extent and there are some good signs of progress. There are a few collaborations in progress. He said that he would like to see more graduate students exposed to business. **Senator Schroeder** said that from earlier presentations, it would seem that researchers need these skills to be successful in getting their findings to the marketplace, to which **Dr. Tracy** agreed. **Senator Schroeder** asked if there is anything the task force can do to help facilitate this. **Dr. Tracy** said that today there needs to be encouragement for researchers to be able to create their own companies after they graduate in Idaho. He also said there needs to be an incentive for universities to teach these students a business component for credit in the same fashion that there are incentives for Ph.D. candidates to have papers published.

Dr. Tracy ventured that having a research center in Boise would be a good thing but it would have to have a different business model than what the universities currently operate under. It would have to be fairly autonomous in its decisions in regard to human resources, business management and fiscal management. Entities like this use growth to avoid debt. State agencies and universities avoid debt by restricting spending, and the two are very different.

Senator Schroeder and Representative Jones both stated that they would like a summary of **Dr. Tracy's** presentation for the task force's consideration in making their decisions. **Dr. Tracy's** PowerPoint presentation is available as an attachment to these minutes at: www.legislature.idaho.gov.

Representative Jones stated that the next meeting will focus on agriculture biotech and biomaterials and will include a presentation from BioNational on state policy and what has been done in other areas.

Representative LeFavour said that she would like to have the issue of what happens to intellectual property of the researchers under these collaborations clarified at a future meeting. **Representative Rydalch** commented that under the federal system, intellectual property is negotiated with the individual or private industry through a cooperative research and development agreement. This is a specific document outside of the federal procurement system that was adopted by Congress in 1980. It has been updated since then and is a very helpful tool to allow federal laboratories to work with private industry and protect that intellectual property. She said the university has a system that was passed by Congress that allows them intellectual property protection as well. She suggested having someone from the federal laboratory system, or the University of Idaho, present what has worked in regard to their systems. **Senator Schroeder** indicated they would try to have a short presentation on this at the next meeting.

The meeting was adjourned at 4:50 p.m.